A

A.A Background

TABLE 6: Key dates in BRAC 2005 process

Date	Event
November 15, 2002	BRAC process initiated by SECDEF.[1]
February 12, 2004	Final base selection criteria published by SECDEF.[2]
March 23, 2004	Need for BRAC 2005 certified by SECDEF.[3]
April 1, 2005	BRAC commissioners appointed by President Bush.[4]
May 13, 2005	Recommendations (BRAC list) announced by SECDEF.
July 1, 2005	GAO reported analysis of DoD's recommendations.[5]
August 24–27, 2005	Final deliberations and vote by BRAC commission[6]
2006–	BRAC actions implemented

SECDEF=Secretary of Defense Donald Rumsfeld [1,5] Government Accountability Office. 2005. *Analysis of DOD's 2005 selection process and recommendations for base closures and realignments.* GAO-05-785. Technical report
[2,3] United States Department of Defense. 2005. *Base Closure and Realignment Report.* http://archive.defense.gov/brac/pdf/Vol_I_Part_1_DOD_BRAC.pdf (accessed May 12, 2013), pages 2, 18
[4] US Department of Defense. 2005. "Base Realignment and Closure." http://www.defense.gov/brac/faqs001.html (accessed May 12, 2013) [6] Defense Base Closure and Realignment Commission. 2005. "Hearing Transcripts and Additional Information." http://www.brac.gov/hearingInfo.html (accessed May 12, 2013)

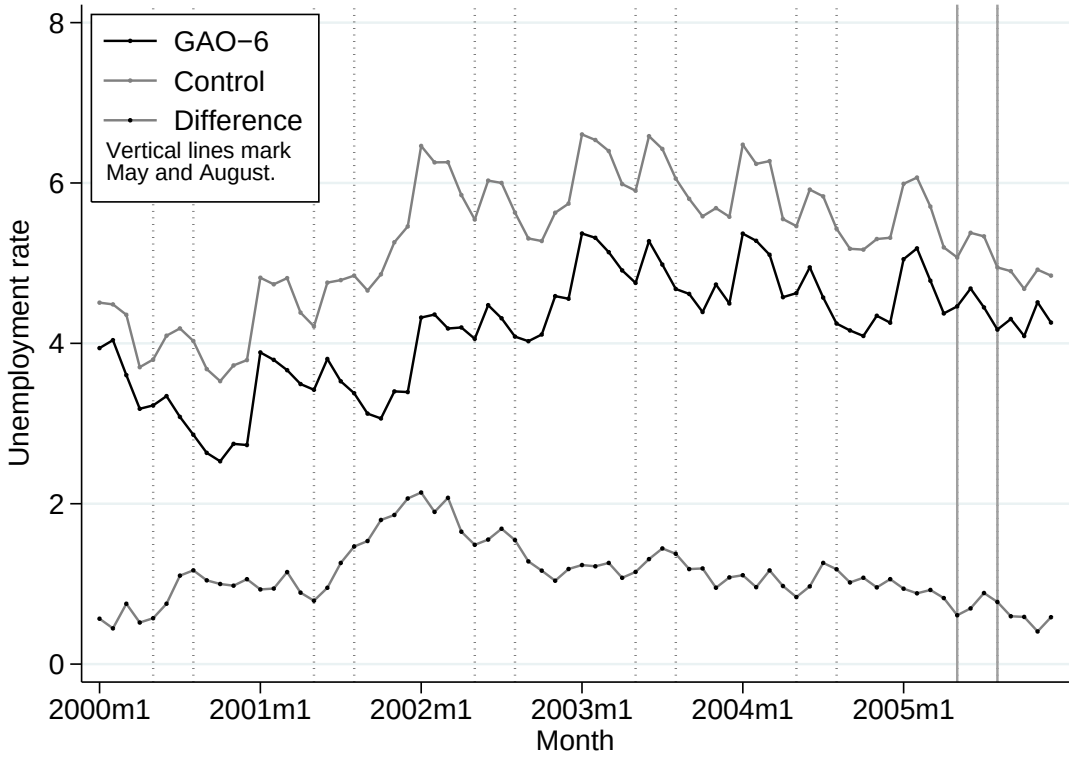


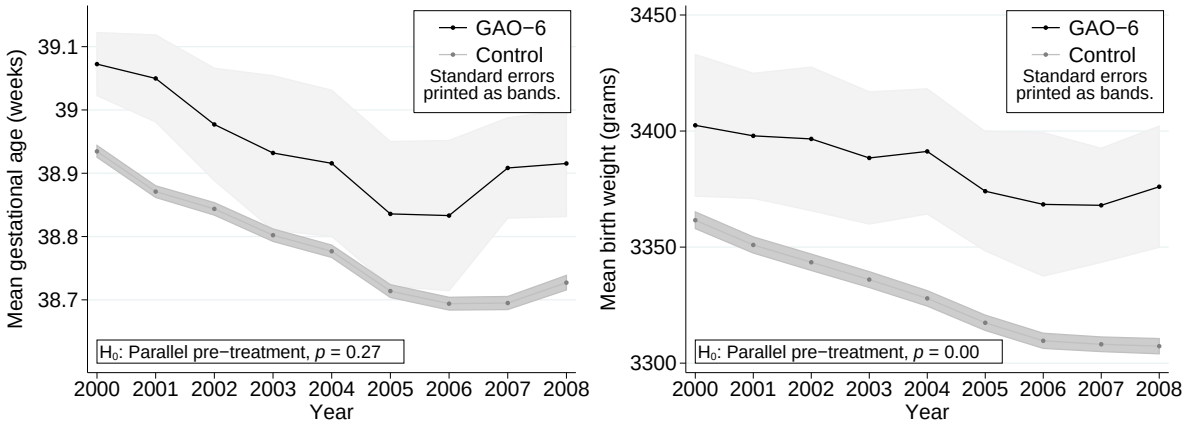
FIGURE 4: Unemployment rates by area type, 2000–2005

TABLE 7: Summary statistics for birth data, 2000–2005

	All	GAO-6	Control groups		
			Baseline	Military	States
Mothers' characteristics:					
Age < 20	7.20	7.81	7.63	7.50	7.95
Age $\in [20, 24]$	25.76	29.96	26.96	28.51	27.65
Age $\in [25, 34]$	52.58	49.22	51.83	49.89	51.24
Age > 34	14.46	13.00	13.58	14.10	13.16
Hispanic	21.70	11.81	22.63	24.85	19.58
Non-Hispanic white	57.98	71.86	59.54	45.64	64.13
Non-Hispanic black	12.20	5.33	10.15	12.38	8.39
Non-Hispanic other	7.34	9.39	7.09	15.56	6.93
Less than high school	18.42	11.73	19.67	15.42	18.48
High school	30.63	37.19	31.46	34.00	32.67
Some college	22.14	26.03	22.34	24.56	22.82
College graduate	27.45	23.96	25.47	23.86	24.59
Married	67.77	69.69	66.95	69.11	64.31
Gained $<$ 16 lbs.	12.18	11.11	12.44	11.57	11.38
Gained $>$ 60 lbs.	2.03	1.74	2.04	2.24	2.25
Smoked while preg.	9.49	14.42	10.53	5.87	13.72
Cigs. per day	1.08	0.80	1.21	0.82	0.43
Prenatal visits	11.64	11.51	11.64	11.54	11.27
C-section	24.71	23.08	24.40	24.20	23.60
Induction	20.30	17.37	20.55	14.09	22.29
Child characteristics:					
Female	48.80	49.00	48.80	48.69	48.78
Birth weight (grams)	3347.28	3391.48	3346.90	3343.11	3337.69
Gestational age (weeks)	38.84	38.96	38.85	38.89	38.81
Low weight ($<$ 2500g)	5.73	5.04	5.71	5.75	5.82
Preterm ($<$ 37 wks.)	9.86	8.38	9.89	9.79	10.14
Births	13,698,648	38,755	3,098,584	702,046	1,104,693

Notes. Variables are binary and expressed as percentages unless otherwise specified.

A.B Results



(A) (B)

FIGURE 5: Year-to-year trends in gestational age and birth weight

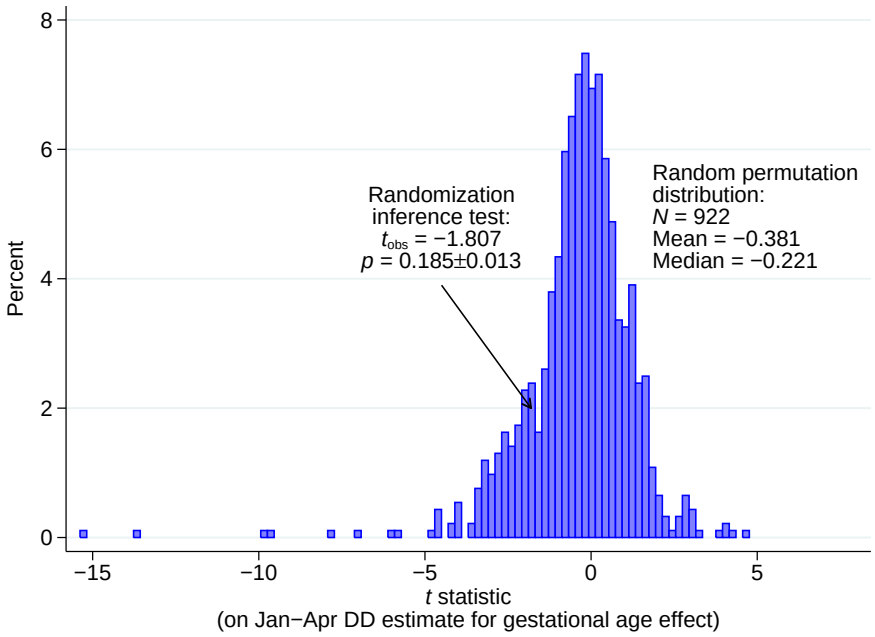


FIGURE 6: Histogram of randomization test results, Jan.–Apr. '05

TABLE 8: Alternative estimated effects of BRAC list announcement on gestational age and birth weight

	Gestational age (days)					Birth weight (grams)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jan.–Apr. '04	0.314	0.326	0.338	0.052	0.150*	9.665	-3.146	0.649
	(0.237)	(0.240)	(0.408)	(0.107)	(0.069)	(13.600)	(2.235)	(1.988)
May–Aug. '04	-0.216	-0.198	-0.096	-0.034	0.137*	5.877	-4.470	1.520
	(0.339)	(0.339)	(0.442)	(0.114)	(0.067)	(9.719)	(2.727)	(2.353)
Sept.–Dec. '04	-0.572	-0.612	-0.422*	0.006	0.064	-22.055**	-3.433	2.895
	(0.571)	(0.563)	(0.189)	(0.082)	(0.061)	(7.165)	(4.097)	(2.828)
Jan.–Apr. '05	-0.547	-0.527	-0.301	0.210*	0.232**	-15.219	-2.262	2.548
	(0.565)	(0.565)	(0.272)	(0.105)	(0.073)	(16.591)	(4.833)	(3.561)
May–Aug. '05	-0.856	-0.837	-0.485*	0.104	0.150*	-32.966*	1.133	3.946
	(0.747)	(0.748)	(0.215)	(0.095)	(0.072)	(15.433)	(5.341)	(4.048)
Sept.–Dec. '05	-0.075	-0.102	0.374	0.216*	0.161*	-14.683	5.086	10.236*
	(0.895)	(0.885)	(0.236)	(0.098)	(0.072)	(22.503)	(7.511)	(4.989)
Control group	Baseline	¬(Major|Minor)	¬(Major|Minor)	¬(Major|Minor)	¬(Major|Minor)	¬(Major|Minor)	¬(Major|Minor)	¬(Major|Minor)
Treatment group	GAO-6	GAO-6	GAO-6	≥Major	≥Minor	GAO-6	≥Major	≥Minor
Quadratic trend	Yes	Yes	No	No	No	Yes	Yes	Yes
PTT, 2000–2003: p	0.175	0.144	0.617	0.179	0.441	0.031	0.817	0.886
SIT: p	0.000	0.000	0.000	0.417	0.001	0.000	0.484	0.108
Equality test: p	0.000	0.001	0.000	0.458	0.549	0.000	0.304	0.008
Mean deviation test: p	0.000	0.000	0.000	0.212	0.481	0.031	0.913	0.167
Cells	115,708	109,375	109,375	119,164	123,196	109,375	119,164	123,196
Clusters	1,646	1,558	1,558	1,694	1,750	1,558	1,694	1,750
Adj. R^2	0.342	0.304	0.303	0.381	0.406	0.455	0.548	0.573

Notes. Estimates show difference-in-differences estimates of the effect of being in the areas described in the "Treatment type" row. Standard errors, in parentheses, are clustered by BRAC-defined economic areas. All models include year and calendar month-by-treatment group indicators. The various hypothesis tests are as described elsewhere in the paper. Symbols of significance at level p: $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

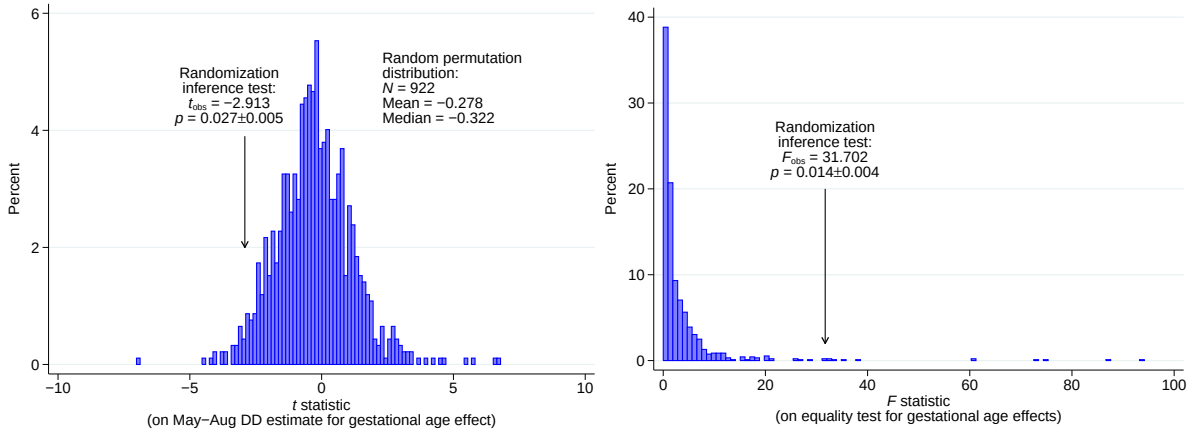


FIGURE 7: Histograms of randomization test results, May–Aug. coefficients and equality test

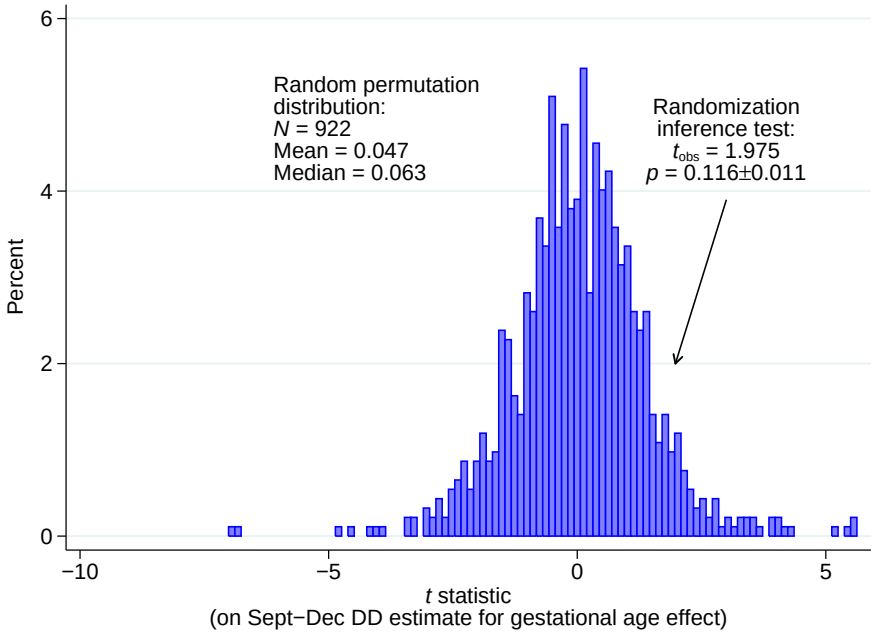


FIGURE 8: Histogram of randomization test results, Sept.–Dec. '05

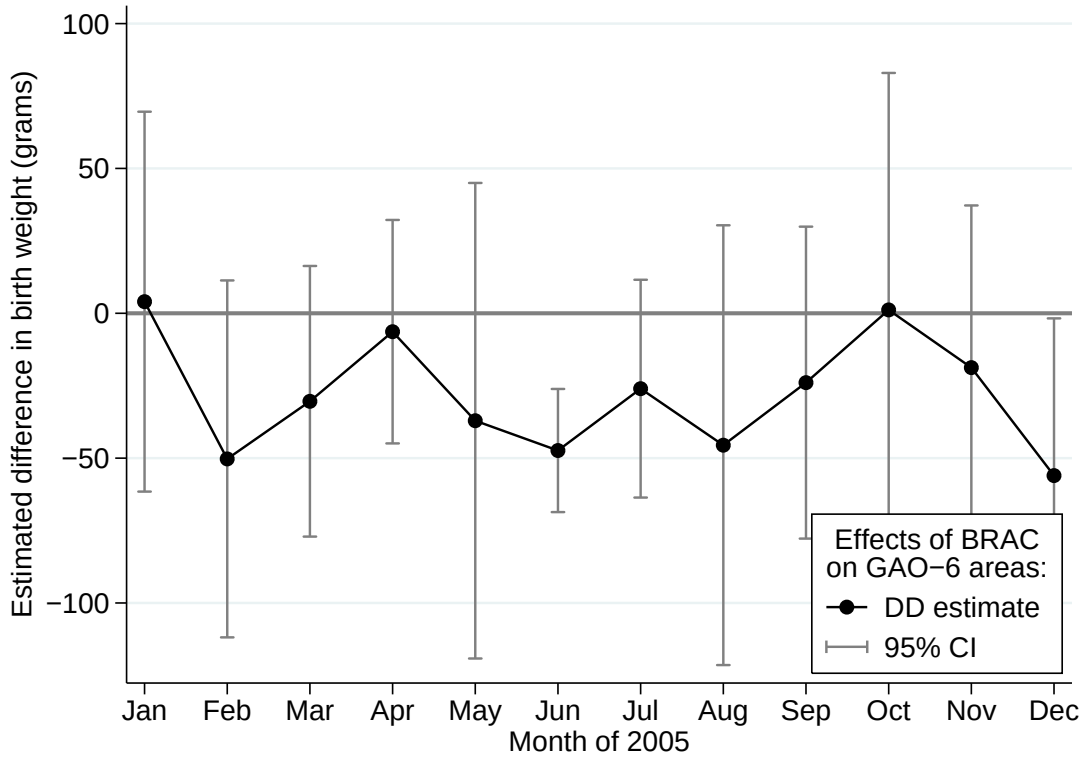


FIGURE 9: Estimated birth weight effects by month

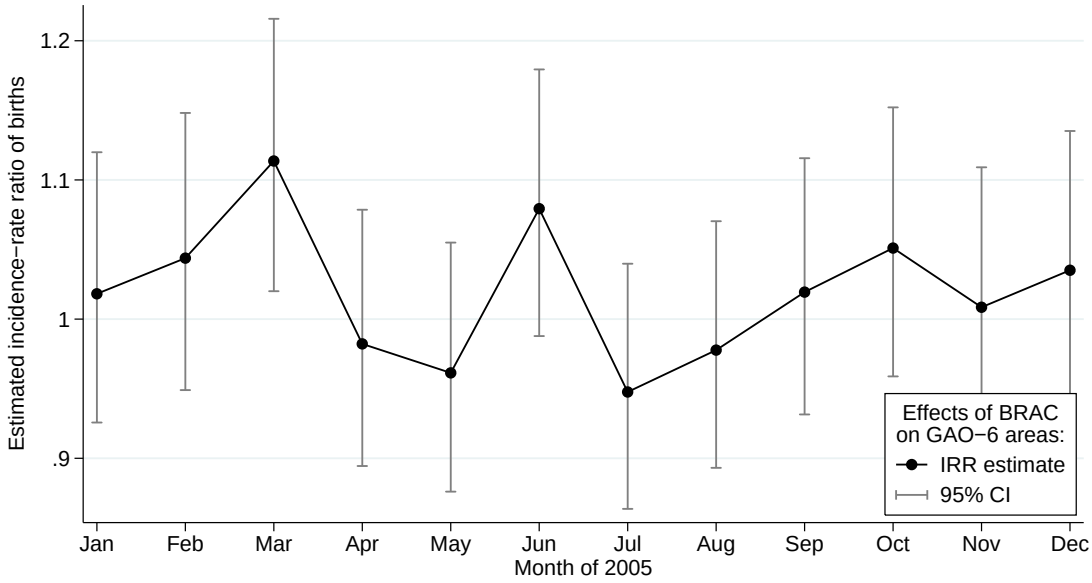


FIGURE 10: Estimated birth rate effects by month

TABLE 9: Sensitivity of estimates to the specification of demographic controls

	Gestational age (days)					Birth weight (grams)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Jan.–Apr. '04	0.349	0.252	0.237	0.232	0.265	11.115	9.052	8.001	6.903	6.154
	(0.418)	(0.410)	(0.427)	(0.426)	(0.421)	(11.924)	(13.609)	(12.572)	(13.101)	(13.590)
May–Aug. '04	-0.070	-0.186	-0.293	-0.285	-0.253	4.761	4.395	7.201	7.095	6.303
	(0.489)	(0.441)	(0.419)	(0.421)	(0.427)	(9.258)	(9.730)	(13.485)	(13.216)	(14.455)
Sept.–Dec. '04	-0.340	-0.452*	-0.380^{+}	-0.372^{+}	-0.325	-21.373**	-24.676**	-24.216**	-24.276**	-24.359**
	(0.215)	(0.189)	(0.219)	(0.216)	(0.213)	(8.271)	(6.982)	(9.183)	(9.148)	(9.189)
Jan.–Apr. '05	-0.352	-0.421	-0.369	-0.389	-0.358	-17.081	-17.829	-20.246	-21.639	-22.293
	(0.269)	(0.271)	(0.265)	(0.276)	(0.240)	(14.383)	(16.505)	(15.994)	(15.874)	(15.871)
May–Aug. '05	-0.517*	-0.603**	-0.595*	-0.594*	-0.567*	-30.488*	-35.164*	-35.894^{+}	-36.756^{+}	-37.634^{+}
	(0.250)	(0.204)	(0.273)	(0.267)	(0.226)	(12.270)	(15.163)	(19.721)	(19.900)	(20.272)
Sept.–Dec. '05	0.405	0.306	0.355	0.354	0.386^{+}	-19.075	-19.596	-21.943	-22.633	-23.080
	(0.247)	(0.235)	(0.243)	(0.255)	(0.216)	(25.416)	(22.386)	(28.659)	(29.189)	(30.166)
Control group	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
Demographics	No	Yes	Interacted[1]	Interacted[2]	Interacted[3]	No	Yes	Interacted[1]	Interacted[2]	Interacted[3]
Equality test: p	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.072	0.085	0.074
Deviation test: p	0.000	0.000	0.000	0.000	0.000	0.177	0.044	0.076	0.084	0.070
Cells	115,708	115,708	115,708	115,708	115,708	115,708	115,708	115,708	115,708	115,708
Clusters	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646
Adj. R^2	0.337	0.341	0.341	0.343	0.345	0.499	0.514	0.514	0.514	0.515

Notes. Difference-in-differences estimates displayed. Standard errors, in parentheses, are clustered by county. All models include year and calendar month indicators. [1] Interacted with treatment group. [2] Interacted with treatment group and calendar month. [3] Interacted with treatment group, calendar month, and year. Statistical significance symbols: $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

TABLE 10: Estimated effects of BRAC list announcement on complications and abnormalities

	Abnormal conditions of the newborn				Complications of labor and/or delivery			
	Any	Meconium aspiration syndrome	Ventilator 30+ min.	Ventilator any	Any	Breech	Dysfunc. labor	Meconium staining
Jan.–Apr. '04	0.031	0.000	0.000	0.033	0.027^{+}	0.001	-0.002	0.015^{+}
	(0.026)	(0.002)	(0.004)	(0.025)	(0.014)	(0.007)	(0.008)	(0.009)
May–Aug. '04	0.004	-0.004*	-0.003	0.008	0.032*	0.003	0.000	0.008
	(0.006)	(0.002)	(0.008)	(0.007)	(0.015)	(0.002)	(0.004)	(0.005)
Sept.–Dec. '04	-0.006	-0.002	-0.005	-0.002	0.025	0.004	0.005	0.022**
	(0.008)	(0.002)	(0.005)	(0.008)	(0.024)	(0.004)	(0.005)	(0.008)
Jan.–Apr. '05	0.009	-0.002	-0.001	0.009^{+}	0.031^{+}	0.006	-0.003	0.020*
	(0.006)	(0.002)	(0.007)	(0.005)	(0.019)	(0.004)	(0.009)	(0.010)
May–Aug. '05	-0.006	-0.004^{+}	-0.001	-0.000	0.037	0.001	-0.002	0.007
	(0.013)	(0.002)	(0.009)	(0.014)	(0.026)	(0.005)	(0.009)	(0.009)
Sept.–Dec. '05	-0.009	-0.002	-0.001	-0.007	0.051*	0.005	0.011*	0.022**
	(0.012)	(0.003)	(0.003)	(0.013)	(0.021)	(0.004)	(0.005)	(0.004)
Control group	States	States	States	States	States	States	States	States
PTT, 2000–2003: p	0.190	0.428	0.282	0.208	0.000	0.199	0.008	0.672
SIT: p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Equality test: p	0.315	0.148	0.979	0.325	0.042	0.647	0.005	0.008
Mean deviation test: p	0.494	0.051	0.941	0.892	0.881	0.545	0.628	0.191
Cells	16,514	16,514	16,514	16,524	16,518	16,518	16,518	16,518
Clusters	240	240	240	240	240	240	240	240
Adj. R^2	0.601	0.221	0.224	0.616	0.768	0.139	0.408	0.518

Notes. Difference-in-differences estimates displayed. Standard errors, in parentheses, are clustered by county. All models include year and calendar month indicators. Statistical significance symbols: $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

A.C Disaggregated Data: Discussion and Results

Note about specifications using county-month aggregated data — For individual i in county c in month m let the outcome y be given by the model $y_{i,c,m} = \alpha_c + \gamma_m + \delta D_{c,m} + \beta X_{i,c,m} + \epsilon_{i,c,m}$. The county and time fixed effects are α_c and γ_m. The vector of individual demographic characteristics is $X_{i,c,m}$. Note that the treatment indicator $D_{c,m}$ varies only at the county-month level because we assume all individuals in a county receive the BRAC announcement or not. The regression specifications in the analysis use the county-month means $\bar{y}_{c,m} = \frac{1}{N_{c,m}} \sum_i y_{i,c,m}$, where the number of births in county c in month m is $N_{c,m}$, rather than the individual outcomes. By exploiting linearity, we can write the average as $\bar{y}_{c,m} = \alpha_c + \gamma_m + \delta D_{c,m} + \beta \bar{X}_{c,m} + \bar{\epsilon}_{c,m}$, where $\bar{X}_{c,m} = \frac{1}{N_{c,m}} \sum_i X_{i,c,m}$ and $\bar{\epsilon}_{c,m} = \frac{1}{N_{c,m}} \sum_i \epsilon_{i,c,m}$. Therefore, the effect of the announcement, δ, is the same in both the individual and aggregated models. The estimator weights the aggregated data according to the number of observations incorporated into the average $N_{c,m}$.

Explanation of individual-level estimates — The individual-level estimates use the same samples as the main analysis except that the data are not aggregated into county-month cells and the year 2006 is included.[30] The states and military samples are used for computational tractability. Each birth is assigned a birth date corresponding to the midpoint of the month of birth. A nominal start date is assigned by subtracting the gestational age from the birth date (without adding two weeks). Exposure to the BRAC announcement for each birth was calculated by comparing the nominal start date with May 13, 2005. Exposure in the first trimester was defined as having a nominal start date within the period starting 13 weeks before May 13, 2005 and ending on May 13, 2005. Exposure in the second trimester was defined as having a nominal start date within the period starting 26 weeks before May 13, 2005 and ending 13 weeks before May 13, 2005. Exposure in the third trimester was defined as having a nominal start date more than 26 weeks before May 13, 2005 and being born after May 13, 2005. In addition, exposure calculations also required that the pregnancy reached the trimester in question. The full-term instrument is defined for each birth by calculating the exposure for a pregnancy that started on the same date and ended with a gestational age of 39 weeks.

For each birth indexed by (i, c, y, m), which means birth i in county c in year y in calendar month m, the outcome x is modeled by

$$x_{i,c,y,m} = \sum_{t=1}^{3} (\beta_t D^t_{i,c,y,m} + \psi_t B^t_{i,c,y,m}) + \boldsymbol{\phi}' \boldsymbol{Z}_{i,c,y,m} + \alpha_c + \gamma_y + \delta_m + \Delta_m \times \{c \in \text{GAO-6}\} + \epsilon_{i,c,y,m} \quad (1)$$

where

- B^t indicates if the pregnancy was in trimester t on May 13, 2005,
- $D^t_{i,c,y,m}$ indicates if the pregnancy was in trimester t on May 13, 2005 and $c \in$ GAO-6,
- $\alpha_c, \gamma_y, \delta_m, \Delta_m$ are county, year, month, and interacted month fixed effects, and
- $\boldsymbol{Z}$ is a vector of mother characteristics (as described in the main text).

30. South Dakota contains a GAO-6 site and switched to the revised birth certificate in 2006. So some non-comparable items related to complications and abnormalities are not considered in the individual-level results.

Thus, the estimate of β_t is an estimate of effect of exposure to the BRAC announcement in trimester t. These estimates are reported in table 11. In the instrumented models, the variables B^t and D^t are instrumented for by the full-term instruments $\tilde{B}^t$ and $\tilde{D}^t$, respectively. That is, $\tilde{B}^t_{i,c,y,m}$ takes the value that $B^t_{i,c,y,m}$ would have if birth (i, c, y, m) occurred at exactly 39 weeks gestational age. The two variables are identical for all births that actually had a gestational age of 39 weeks. Models that put any characteristic of the mother on the left-hand side do not put any demographic characteristics on the right-hand side.

TABLE 11: Individual-level estimates of effects of exposure to the BRAC announcement

Panel A.

	Gestational age (days)				Birth weight (grams)			
	Simple exposure	Instrumented	Simple exposure	Instrumented	Simple exposure	Instrumented	Simple exposure	Instrumented
Trimester 1	0.533*	0.493^{+}	0.447*	0.445*	6.922	6.390	12.612	12.695
	(0.262)	(0.259)	(0.224)	(0.221)	(9.154)	(9.289)	(8.748)	(8.933)
Trimester 2	0.060	0.075	0.286	0.299	21.122	21.102	22.073^{+}	22.019^{+}
	(0.390)	(0.384)	(0.351)	(0.349)	(13.044)	(13.005)	(12.451)	(12.536)
Trimester 3	-1.609**	-1.104*	-1.243**	-0.917*	-22.416	-24.948	-16.162	-21.595
	(0.395)	(0.462)	(0.329)	(0.452)	(16.547)	(20.915)	(16.419)	(21.002)
Control group	Military	Military	States	States	Military	Military	States	States
Births	872,037	872,037	1,345,383	1,345,383	872,037	872,037	1,345,383	1,345,383
Clusters	45	45	240	240	45	45	240	240
Adj. R^2	0.017	0.014	0.016	0.013	0.044	0.044	0.039	0.039

Panel B.

	Preterm (proportion)				Low birth weight (proportion)			
	Simple exposure	Instrumented	Simple exposure	Instrumented	Simple exposure	Instrumented	Simple exposure	Instrumented
Trimester 1	-0.017**	-0.017**	-0.015**	-0.015**	-0.011	-0.011	-0.013	-0.013
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)	(0.008)	(0.008)
Trimester 2	-0.008^{+}	-0.008^{+}	-0.009**	-0.009**	-0.005	-0.005	-0.004	-0.004
	(0.004)	(0.004)	(0.003)	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)
Trimester 3	0.018*	0.013	0.018**	0.014	0.017*	0.018*	0.019**	0.020**
	(0.007)	(0.010)	(0.007)	(0.010)	(0.007)	(0.007)	(0.007)	(0.007)
Control group	Military	Military	States	States	Military	Military	States	States
Births	872,037	872,037	1,345,383	1,345,383	872,037	872,037	1,345,383	1,345,383
Clusters	45	45	240	240	45	45	240	240
Adj. R^2	0.009	0.008	0.011	0.010	0.011	0.011	0.011	0.011

Panel C.

	C-section	Induced labor	Meconium staining	Mother's age	Tobacco use (Y/N)	Married
Trimester 1	-0.015^{+}	0.021^{+}	0.004	0.012	0.008	0.016
	(0.009)	(0.011)	(0.006)	(0.278)	(0.006)	(0.010)
Trimester 2	0.011	0.034	0.019**	-0.199^{+}	-0.012	0.013
	(0.028)	(0.022)	(0.003)	(0.110)	(0.011)	(0.013)
Trimester 3	0.006	0.054	0.009	-0.082	0.007	0.006
	(0.012)	(0.040)	(0.009)	(0.067)	(0.009)	(0.013)
Control group	States	States	States	States	States	States
Births	1,337,074	1,333,422	1,333,580	1,345,383	1,345,383	1,345,383
Clusters	240	240	240	240	240	240
Adj. R^2	0.027	0.041	0.015	0.057	0.045	0.045

Notes. Difference-in-differences estimates displayed (raw coefficients) from instrumented models. Standard errors, in parentheses, are clustered by county. Symbols of significance at level p: $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.